

**AGRICULTURAL LAND CLASSIFICATION  
BUCKINGHAM RURAL AREAS LOCAL PLAN, BUCKINGHAMSHIRE**

**1.0 BACKGROUND**

- 1.1 Four sites, covering 179.9 ha in total, were surveyed by the ADAS Statutory Unit in February 1993 for the Buckingham Rural Areas Local Plan, to assess the agricultural land quality. The sites have been designated A, B, C and D. Site A is located on the northern edge of Buckingham at Castle Fields Farm and straddles Stowe Avenue. Sites B, C and D are located on the southern side of the Buckingham by-pass, with site B at the western end at Radclive Dairy Farm and site D at the east at Benthill Farm.
- 1.2 A total of 182 observations were made using a dutch auger to a depth of 1.1 m unless prevented by stone. In addition six soil pits were dug to help characterise the soils and assess the subsoil conditions in greater detail.
- 1.3 On the published Agricultural Land Classification (ALC) Map, sheet number 146 (MAFF, 1964) all the sites are mapped as Grade 3. Previous detailed surveys carried out by MAFF in 1988 for the Buckingham Local Plan using the original ALC system (MAFF, 1966 and 1976), show that the land comprises Grades 2, 3a, 3b and 3c, with the majority of the area being Grade 3a.

**2.0 PHYSICAL FACTORS AFFECTING LAND QUALITY**

Climate

- 2.1 Site specific climatic information for the four sites has been obtained by interpolating information contained in the 5 km grid dataset produced by the Meteorological Office (Met Office 1989). This information is shown in summary below:

	SITES			
	A	B	C	D
Annual Average Rainfall (mm)	683	681	679	677
Altitude (m)	100	110	100	90
Field Capacity Days	146	145	145	144
MD Wheat (mm)	103	101	103	104
MD Potatoes (mm)	93	91	93	95
Accumulated Temperature (°C)	1382	1372	1383	1394

These climatic characteristics do not impose any climatic limitation to the ALC grade of the sites.

Altitude and Relief

- 2.2 All four sites are gently sloping and range in height from 90 to 105 m AOD. Gradient and altitude do not constitute limitations to the ALC grading of the four sites.

## Geology and Soils

- 2.3 The published 1:625,000 scale geology map (Geol Surv, 1957) shows the area to be underlain by the Jurassic Middle Cornbrash sedimentary formations.
- 2.4 The published 1:250,000 scale "Soils of Eastern England" map (Soil Surv. 1984) shows that Sites B and C have been mapped as the Ashley Association (\*1), Site D as the Oxpasture Association (\*2) whilst Site A comprises the Ashley Association to the north and Elmton 3 Association (\*3) to the south.

## Site A

- 2.5 Three soil types were mapped on this site. On the higher land to the north of the farm buildings the soils were generally free draining having a heavy clay loam topsoil (occasionally medium clay loam) over a clay or heavy clay loam upper subsoil, over a clay lower subsoil. Topsoils were generally non calcareous and the subsoils showed only faint ochreous mottling at depth. These soils have been assessed as Wetness Class I or occasionally II.
- 2.6 Over the majority of the remainder of the site, similar soils to those described above, but with a wetter moisture regime, have been mapped. These soils are texturally similar, but have slowly permeable subsoil horizons at various depths, giving rise to impeded drainage (Wetness Class II-IV). Topsoils are non calcareous, but subsoils are often calcareous at varying depths associated with chalky boulder clay or brashy weathered limestone. As with the soils described above stone content is variable with topsoils generally very slightly stony, occasionally slightly stony (typically 3-4%) but with subsoil stone content ranging from very slightly stony to moderately stony (typically 5-10%, occasionally 20-30%)

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(\*1) Ashley Association Predominantly fine loamy over clayey stagnogleyic brown earths developed on chalky till. Some calcareous pelosols and argillic pelosols on convex slopes where erosion has largely removed the overlying fine loamy drift. Slight seasonal waterlogging, more severe on the clayey soils.

(\*2) Oxpasture Association Fine loamy over clayey argillic brown earths with accompanying typical stagnogley developed on till derived from Jurassic and Cretaceous rocks with slowly permeable subsoils and seasonal waterlogging.

(\*3) Elmton 3 Association Shallow loamy and clayey soils over limestone and deeper slowly permeable clayey soils on clay-shale occurring on steeper valley sides. Water regime varies from wetness class I-III.

- 2.7 A small area of lighter textured well drained soils occur at the west corner of the site. Profiles typically comprise medium clay loam or sandy clay loam topsoils over heavy clay loam upper subsoils over clay. The soils are typically well drained (Wetness Class I) and non calcareous. Topsoils are generally slightly stony (5-7% flints) with subsoils slightly to moderately stony (10-25%) and often impenetrable to the auger below 50/60 cm.

#### Site B

- 2.8 The majority of the western end of the site comprises free or moderately well drained soils similar to those on Site A described in para. 2.5 above and have been assessed as Wetness Class I or II.
- 2.9 Over the remainder of the site the soils are more poorly drained typically having a heavy clay loam topsoil over a heavy clay loam or clay subsoil over chalky boulder clay at depth. In the north east corner of the site however the topsoil textures are typically clay with a strongly mottled slowly permeable clay subsoil immediately below. Alongside Gawcott Road where the land is under marked ridge and furrow, the topsoil is more typically medium silty clay loam. The soils have been generally assessed as Wetness Class II or III but in the north eastern corner are Wetness Class IV.

#### Site C

- 2.10 The majority of the site comprises soils similar to those described in para. 2.9 above, although nowhere on this site do the topsoils have a clay texture and all the profiles have been assessed as either Wetness Class II or III.
- 2.11 On the highest ground at the south of the site, stony free draining soils have been mapped. These soils have a medium or occasionally heavy clay loam topsoil which is slightly stony (5-8% flints) over a stony heavy clay loam subsoil. The stone content of the subsoil increases with depth ranging from 10% in the upper subsoil to 40% below about 50 cm depth. The stones are typically limestone with some flints and are mainly medium and large in size.

#### Site D

- 2.12 One soil type has been identified on this site and profiles typically comprise heavy clay loam topsoils over clay upper subsoils (occasionally heavy clay loam) which are both either non calcareous or very slightly calcareous. These overlie mainly calcareous lower subsoils of clay which are strongly gleyed. Drainage characteristics vary across the site dependent on the depth to the underlying slowly permeable layer (25-75 cm) and the soils have been assessed as ranging from Wetness Class II-IV. Stone content within the profiles is variable, with topsoils generally slightly stony (typically 3-5%) although locally in the east it may be 8-10%. Subsoil stone contents are typically 5% although locally at the western end may be up to 20%.

### 3.0 AGRICULTURAL LAND CLASSIFICATION

3.1 The sites have been classified using the guidelines contained in the Agricultural Land Classification of England and Wales (MAFF, 1988). The definition of the ALC grades are included in Appendix I

3.2 The table below shows the ALC grades for each of the survey sites.

SITE	GRADE	HECTARES	PERCENTAGE
A	2	11.3	21.2
	3a	30.4	56.9
	3b	3.5	6.6
	Non agricultural	5.4	10.1
	Disturbed	2.8	5.2
	TOTAL	53.4	100
B	2	22.2	44.0
	3a	19.5	38.7
	3b	8.0	15.9
	Farm buildings	0.7	1.4
	TOTAL	50.4	100
C	2	10.3	25.5
	3a	25.5	65.6
	Non agricultural	2.4	5.9
	Urban	1.2	3.0
	TOTAL	40.4	100
D	3a	11.9	33.3
	3b	22.2	62.2
	Urban	1.6	4.5
	TOTAL	35.7	100

## Site A (53.4 hectares)

### Grade 2

- 3.3 Two areas of Grade 2 have been mapped, the largest area at the north west of the site with a smaller area on the extreme western boundary. The former area comprises the well drained fine textured soils described in para. 2.5. Generally the soils are free draining (Wetness Class I), but with fine textured topsoils there is a slight workability limitation during the wetter winter months, thus excluding the land from a higher grade. Occasionally gleying together with a slowly permeable layer is encountered at depth (Wetness Class II) which combined with the lighter medium clay loam topsoils, imposes a slight wetness limitation. Soil profiles with a higher stone content also suffer from a slight droughtiness limitation as the stones reduce the available water capacity of the soils.
- 3.4 The smaller area of Grade 2 to the west, comprises the lighter, stonier soils described in para 2.7. Topsoil stone content typically 6-7% flints (>2 cm diameter) acts as an impediment to cultivation thus limiting the land to Grade 2. Profile stone also causes a reduction in the available water capacity of the soil for crop growth, thus creating a slight droughtiness limitation, which also limits the land to Grade 2.

### Grade 3a

- 3.5 The land graded as 3a occupies the majority of the land on the site and corresponds to the moderately well drained soils described in para 2.6. The presence of a slowly permeable layer typically at 55/60 cm (Wetness Class II) combined with the heavy textured topsoils impose a moderate limitation on the wetness and workability of the land.

### Grade 3b

- 3.6 The land mapped as Grade 3b correlates with the poorer drained soils described in para 2.6 and occurs in two small areas, one at the north of the site, the other in the south west corner. The heavy clay loam topsoils combined with the poor drainage (Wetness Class III and IV) impose a significant limitation on the ability of the land to grow a wide range of crops. Drainage and workability limitations therefore exclude this land from a higher grade.
- 3.7 A water pipeline has recently been laid along the length of the southern boundary of the site and topsoil and subsoils have become mixed. The area also exhibits poor drainage and therefore has also been included within this grade but is shown as disturbed on the map

### Non agricultural

- 3.8 Within the site boundary are areas of gardens, a cemetery and the wide unfenced grass verges alongside Stowe Avenue together with the farm buildings and riding arena and these have been classified as non agricultural.

## Site B (50.4 hectares)

### Grade 2

- 3.9 The majority of the Grade 2 land is mapped at the western end of the site and corresponds to the better drained soils on the site described in para 2.8. These soils have slightly stony medium or heavy clay loam topsoils and are assessed as Wetness Class I or II. These soils will have a minor wetness and workability limitation during the wetter periods of the year limiting them to this grade. A small area of this grade has been mapped at the eastern end of the site where the soils have a medium silty clay loam topsoil, but exhibit a slight wetness limitation.

### Grade 3a

- 3.10 Two areas of Grade 3a have been mapped which correspond with the imperfectly drained soils described in para 2.9. The presence of a slowly permeable subsoil horizon at depth combined with the fine textured topsoil textures impose a moderate limitation on the wetness and workability of the land restricting it to this grade.

### Grade 3b

- 3.11 At the north eastern corner of the site, poorly drained heavy textured soils have been mapped, which are described in para 2.9. These soils have slowly permeable subsoil horizons immediately below the topsoil (Wetness Class IV), which when combined with the clay textures of the topsoil result in difficult working conditions especially during the wetter months of the year. This significant wetness/workability limitation restricts the flexibility of the land to grow a range of agricultural crops and therefore excludes the land from a higher grade.

## Site C (40.4 hectares)

### Grade 2

- 3.12 Two areas of Grade 2 have been mapped which correspond with the better drained soils on the site. The land at the south of the site correlates with the stony soils described in para 2.11. These soils have a slight droughtiness limitation associated with the stone content in the subsoil which restricts the available water capacity of the soil for crop growth.
- 3.13 The land at the north west corner of the site has also been classified as Grade 2. These soils generally have a medium clay loam topsoil and a slowly permeable horizon at depth associated with the underlying chalky boulder clay. This combination results in a minor wetness limitation (Wetness Class II) and during the wetter winter months will cause slight workability restrictions.

### Grade 3a

- 3.14 The majority of the site has been mapped as Grade 3a due to the wetness and workability limitations associated with the soils described in para 2.10. The presence of a slowly permeable subsoil horizon at depth results in these soils being classified as Wetness Class II and when combined with the heavy clay loam topsoil textures which prevail over the site, excludes the land from a higher grade.

### Non agricultural

- 3.15 A strip of non agricultural land has been mapped in the valley bottom. The eastern end comprises an area of scrub woodland on either side of the stream, but at the western end a small pond has been excavated at the edge of the field.

### Site D (35.7 hectares)

#### Grade 3a

- 3.16 The Grade 3a land outcrops to the west and north east of the site coinciding with the better drained, generally stonier soils described in para 2.12. The presence of a slowly permeable layer typically at 55/70 cm depth (Wetness Class II) combined with the heavy textured topsoils impose a moderate limitation on the wetness and workability of the land.

#### Grade 3b

- 3.17 Land graded 3b occurs in the south and east, covering the majority of the site. It corresponds with the poorer drained soils described in para 2.12. The heavy clay loam topsoils combine with a slowly permeable layer at 25/45 cm (ie Wetness Class III/IV) to impose a significant limitation on the workability and wetness of this land, limiting the flexibility of the land from growing a range of agricultural crops. This land therefore is restricted to a Grade 3b potential.

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Resource Planning Team  
ADAS Cambridge.

## REFERENCES

Geological Survey, (1957). Geological map of Great Britain, Sheet 2 second edition, 1:625,000 scale.

MAFF, (1964). Provisional Agricultural Land Classification Map, Sheet 146, 1:63,360 scale.

MAFF, (1966). Agricultural Land Classification. Technical Report No 11, HMSO.

MAFF, (1976). Agricultural Land Classification. The definition and Identification of Sub-grades within Grade 3. Technical Report 11/1, HMSO.

MAFF, (1988). Agricultural Land Classification of England and Wales - Revised guidelines and criteria for grading the quality of agricultural land.

Meteorological Office, (1989). Climatological Data for Agricultural Land Classification.

Soil Survey of England and Wales, (1984). Soils and their Use in Eastern England.

## A P P E N D I X I

### DESCRIPTION OF THE GRADES AND SUBGRADES

The ALC grades and subgrades are described below in terms of the types of limitation which can occur, typical cropping range and the expected level and consistency of yield. In practice the grades are defined by reference to physical characteristics and the grading guidance and cut-offs for limitation factors in Section 3 of the Agricultural Land Classification of England and Wales (MAFF 1988) enable land to be ranked in accordance with these general descriptions. The most productive and flexible land falls into Grades 1 and 2, and Subgrade 3a land collectively comprises about one third of the agricultural land in England and Wales. About half the land is of moderate quality in subgrade 3b or poor quality in Grade 4. Although less significant on a national scale such land can be locally valuable to agriculture and the rural economy where poorer farmland predominates. The remainder is very poor quality land in Grade 5 which mostly occurs in the uplands.

Descriptions are also given of other land categories which may be used on ALC maps.

#### Grade 1 - Excellent Quality Agricultural Land

Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly includes top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.

### Grade 2 - Very Good Quality Agricultural Land

Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than Grade 1.

### Grade 3 - Good to Moderate Quality Agricultural Land

Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2.

#### Subgrade 3a - Good Quality Agricultural Land

Land capable of consistently producing moderate to high yields of a narrow range of arable crops, especially cereals, or moderate yields of a wide range of crops including cereals, grass, oilseed rape, potatoes, sugar beet and the less demanding horticultural crops.

#### Subgrade 3b - Moderate Quality Agricultural Land

Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.

#### Grade 4 - Poor Quality Agricultural Land

Land with severe limitations which significantly restrict the range of crops and/or level of yields. It is mainly suited to grass with occasional arable crops (eg cereals and forage crops) the yields of which are variable. In moist climates yields of grass may be moderate to high but there may be difficulties in utilisation. The grade also includes very droughty arable land.

#### Grade 5 - Very Poor Quality Agricultural Land

Land with very severe limitations which restrict use to permanent pasture or rough grazing except for occasional pioneer forage crops.